

Mariko online event
24-03-2021



LNG bunker supply chain &
development cost



Titan LNG bunkering Sleipnir in Sumatra

TITAN LNG PROFESSIONS

- **Customized deliveries**

- LIN + First gas
- Commissioning cargo
- First time in specific port
- Unpredictable schedule
- De-bunkering

- **Zero carbon shipping**

- ETS carbon accounting
- Net-zero off-setting
- Biogas certificates

- **Optimized economics**

- Price hedging
- Commodity risk advice
- Fleet conversion support

Truck-to-Ship bunkering



Ship-to-Ship bunkering (Port)



Ship-to-Ship bunkering (Sea)



Supply to Industrial & Fuel stations



TITAN LNG BARGES

First LNG bunker barge in ARA region

- Simultaneous delivery during cargo operation
- 1500 Cbm capacity per FlexFueller in 4 tanks
- Over 200 safe operations completed
- 100% compatibility score
- Loading from large Bunker Vessels, terminals & trailers
- Able to store Bio-LNG in separate tanks
- Inland water way navigation
- FlexFueller 003 and 004 scheduled (2023)
- Titan LNG Hyperion Barge under development – FID Q2 2021 – 8000Cbm capacity – European subsidy awarded under Bio2Bunker project



FlexFueller001 & FlexFueller002 in Amsterdam



Titan LNG Hyperion rendering

ROBUST OPERATIONS WITH MULTIPLE BARGES CREATING RELIABILITY

GREEN ZEEBRUGGE LONG TERM TC FROM NYK

Bunkering with Green Zeebrugge



Growing supply possibilities

- Performing bunkering in North West Europe
- 5200 Cbm capacity
- Suitable for gassing up and cooling down receiving vessels
- NYK and Titan LNG compliment each other in terms of knowledge, logical fit
- Enabling sourcing from various terminals
- Filling the FlexFuelers to improve economics
- Titan LNG can conduct larger bunkering

LNG BUNKER INFRASTRUCTURE AVAILABLE

Just like “normal” bunkering

- Simultaneous operations
- Port network growing
- FlexFueller performed >200 bunkerings
- Accreditation ensures safety
- Flow meter deliveries
- Quality management



Bunkering Wes Amelie in Rotterdam

TERMINALS ARE INCREASINGLY ALLOWING SIMOPS

SUPPLY CHAIN ALSO ALLOW FOR “SPECIAL OPS”

De-Bunkering, Gas Up, Cooldown

- Commissioning activities
- (emergency) De-bunkering
- Drying & Cooldown
- Gassing up operations
- Standardisation of documentation and terms



FlexFueler performing a De-Bunkering

EXPERIENCE AND TRACK RECORD = MORE EASY PERMITTING

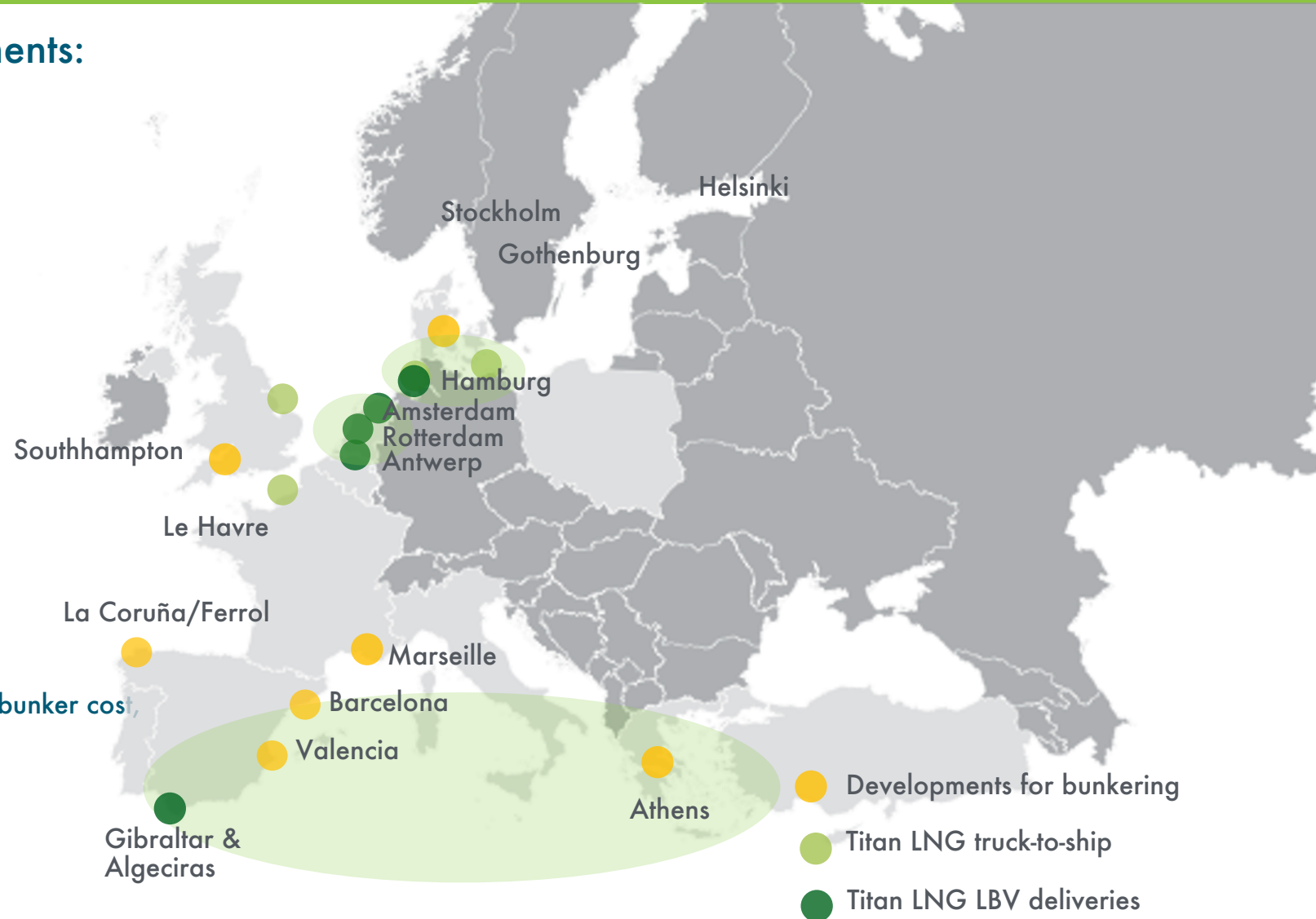
EUROPEAN LNG Bunker developments

Ports have specific bunkering requirements:

- Different maturity in legislation
- Different types of activities inside ports
- Demand profile per port
- OPL vs simops
- Reliability of supply
- Quality control
- Large volume range barges/ships 250-18,000 cbm
- Close proximity to LNG source likely lowers the overall bunker cost, cementing competitive advantage



Range of solutions



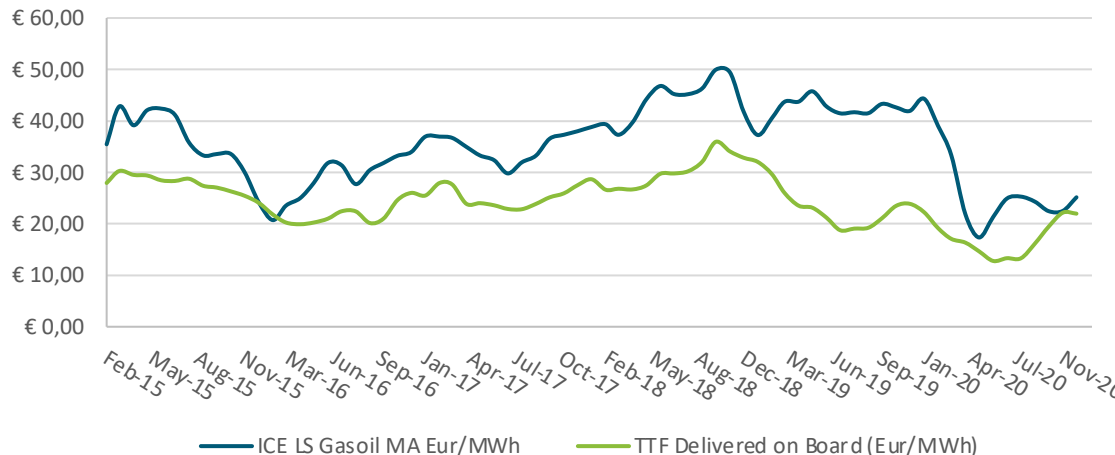
SUPPLY CHAIN AND DELIVERY COSTS



LNG molecule pricing is 50% of the delivered price onboard and will change

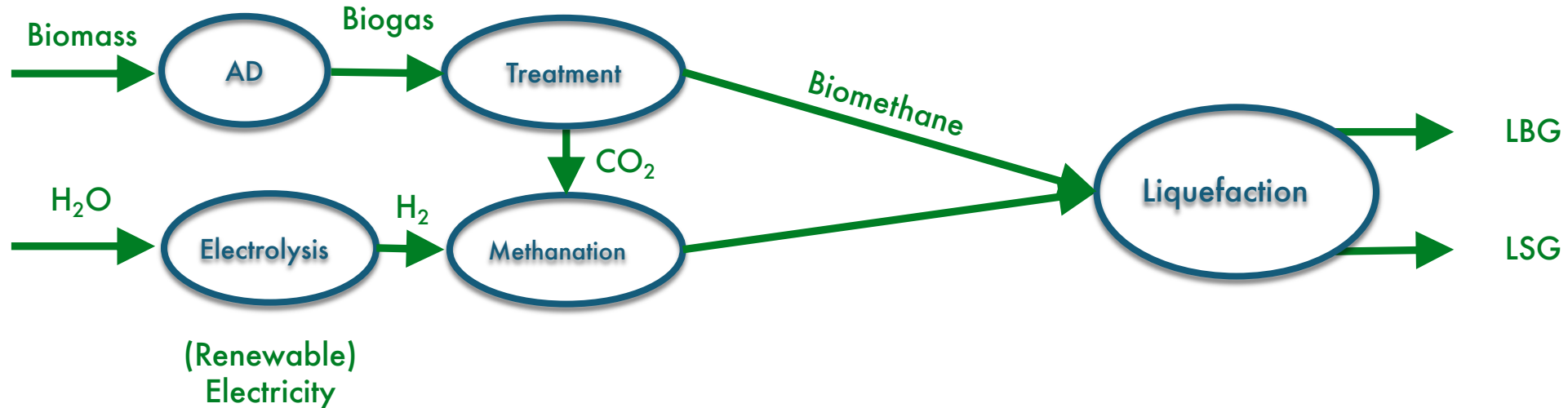
- More LNG loading terminals in the pipeline
- LNG = more economical already
- Future developments in infrastructure will enable a even larger discount vs MGO
- Port Costs reduced for LNG powered vessels
- SIMOPS will increase uptime of the receiving vessels

Historical MGO vs TTF Price (Euro/MWh)



THE ROAD TO ZERO CARBON

Combined Liquid Bio and Synthetic Gas production process



Upgrading biogas to LBG is existing, operational technology

- Being upscaled
- Carbon neutral solution

Energetic efficiencies:

- Biomass to LBG: 70%
- Power to LSG: 40%

Combining the LBG production chain with methanation absorbs CO₂ waste stream

TITAN BIO-LNG: SCALABLE & CERTIFIED

Bio-LNG - a scalable fuel

- 2020: ~ 65 TWh/PA biogas & ~ 22 TWh biomethane (EU)
- 2030: ~ 475 TWh/PA biomethane (10% EU gas mix) *

E-L(N)G – made from renewables

- Green Hydrogen conversion to Methane and then liquified
- Best carbon neutral energy carrier and reducing local emissions

Titan LNG - certified Bio-LNG supplier

- Certified sustainable biomass
- Certified chain of custody
- Assurance of Bio-LNG sustainability claims
- Future proof: REDII 2030 compliant
- Titan LNG ISCC-EU certified
- ISCC-EU pure BioLNG & Blends delivered



LNG fueled vessels – 100% future proof



	Today		2040-50	
Rationale	(Bio/e)LNG investment back in 2-6 yrs		NO additional investments for sailing on Fossil Free Bio or e-LNG	
Footprint	CO2	-20%	CO2	-100%
	NOx	-95%	NOx	-95%
	SOx	-99%	SOx	-99%
	PM	-95%	PM	-95%
	Carbon black	-100%	Carbon black	-100%



Mission

Titan LNG decarbonizes (marine) fuels by producing
and supplying clean (bio)LNG today and e-fuels in the
future
